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FOR

RECORDING FACTS AND ANECDOTES

RELATING TO

QUADRUPEDS, BIRDS, REPTILES, FISHES AND INSECTS.

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Price ONE SHILLING.

ENTOMOLOGICAL SOCIETY.

November 19, 1866.—Sir JOHN LUBBOCK, Bart., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1865, No. 4; 1866, No. 1; presented by the Society. 'On the Origin of Species by means of Natural Selection, or the Preservation of favoured Races in the Struggle for Life,' by Charles Darwin, M.A., F.R.S., &c.; by the Author. 'Catalogue of Longicorn Coleoptera, collected in the Island of Penang by James Lamb, Esq,' by Francis P. Pascoe, F.L.S., F.Z.S., &c., late Pres. Ent. Soc.; by the Author.

Election of Members.

Percy Bicknell, Esq., of Beckenham, was elected a Member; and G. H. Verrall, Esq., of Lewes, an Annual Subscriber.

Exhibitions, &c.

Prof. Westwood exhibited pupæ of Thecla Betulæ, and remarked that the larva does not spin any silken band or girth, but simply fixes itself lengthwise on the leaf.

Mr. A. F. Sheppard sent for exhibition, on behalf of Mr. Gregson, remarkable varieties of Pieris Rapæ, P. Napi, Leucophasia Sinapis and Anthocharis Cardamines; also Gelechia ——?, taken by Mr. Hodgkinson in North Lancashire and by Mr. Gregson in South Lancashire; Phycita subornatella of Zeller, taken in the Isle of Man and in Ireland; and an Acidalia, respecting which the following extract was read from a letter from Mr. Gregson:—

> "I send you Acidalia veterata; it may be the same as one named mancuniata by Dr. Knaggs from some aberrant stunted second-brood females, but as the rule is to name from normal males (not females) as types, of course his name falls, especially as his diagnosis may mean anything or nothing. I do not know Dr. Knaggs, and of course have not any wish to offend him, but could not accept his new name for my old insect when based upon an abnormal type."

Mr. Stainton exhibited a living specimen of Stathmopoda Guerinii (S. S. 565), and called attention to the peculiar position of the hind legs, which were elevated and stretched out sideways as in S. pedella (which received the name of pedella from Linné from the peculiar posture of its hind legs) and as in the curious Indian insect Atkinsonia Clerodendronella, of which a drawing by a native artist at Calcutta was also exhibited. With reference to the galls in which the larvæ of S. Guerinii reside, Mr. Stainton referred to a passage in Réaumur (vol. iii. p. 305) in which these galls on the 'terebinthe' and their Aphis-inhabitants were mentioned, the plant which bore them having obtained the name of the fly-tree (*l'arbre aux mouches*) from the pod-like excrescences containing these Aphides. Mr. Stainton referred to the possibility of the larva of S. pedella being an inhabitant of galls, and thought that the habitat assigned by Linné for the larva "*in alni foliis, subcutanea*" might after all be correct: he quoted a passage from a paper by T. Bergmann, who had furnished Linné with the notice of the habit of Tinea pedella, to shew that that observer was aware of the existence of

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Lepidopterous larvæ in galls, and finally he quoted a passage from the Proceedings of the Entomological Society of Philadelphia, vol. 5, pp. 143, 144, to shew that Mr. Benjamin D. Walsh had bred a small moth (a Batrachedra) in plenty from galls formed by one of the Tenthredinidæ on the leaves of willows.—"Each gall containing a single larva, unaccompanied by the larva of the Nematus which makes the gall, which it must consequently have destroyed or starved out, either in the egg or in the larva state."

Mr. E. G. Meek exhibited Dicrorampha flavidorsana (Knaggs, MS.),* a species new to Science, from North Devon and Haslemere; a species of Hadena, supposed to be new, taken by Mr. Harrington near New Cross;† and Stigmonota leguminana from Epping Forest.

Mr. Hewitson sent for exhibition some eggs "found upon the grass near some heath" and which were unknown to him: no member present hazarded a conjecture as to the insect to which the eggs were referable.

Mr. Hewitson communicated the following note on the plumules on the wings of butterflies:—

"When I was last at Bowdon, Mr. Watson, who has been studying the plumules from the wings of butterflies, pointed out to me a group of the Pieridæ which he considered ought to be set apart from the rest of the genus, having none of those plumules upon them which abound on the other species. This group consists of P. Thestylis of Doubleday, an undescribed species closely allied to it, P. Clemanthe, *Dd.*, and P. Autothisbe of Boisduval. This is confirmed by another distinctive character which these species possess, the costal margin of the anterior wings being strongly serrated. I felt therefore very much interested, when, on paying a visit to Mr. Wallace, who is now studying the Pieridæ, I found that he has also set apart this group. I send this notice to confirm an opinion I have expressed elsewhere, that a study of these plumules will produce evidence which 'will assist in determining the sexes, as well as in testing the worth of nearly allied species.' I may add that these species have for many years been put together in my collection, having noticed the peculiar serration of the wings."

Mr. E. W. Janson exhibited, on behalf of Mr. T. J. Harris, of Burton-on-Trent, a specimen of Macronychus quadrituberculatus, *Müller*, a Coleopterous insect previously unknown to inhabit Britain, captured by that gentleman, early in the autumn of 1864, in the vicinity of that town.

Mr. S. Stevens exhibited a remarkably fine pair of the rare beetle Eucheirus Duponchelii, and a number of small exotic beetles taken for the most part in ants' nests.

Mr. Weir exhibited a paper-like substance used by a Ceylon ant for lining its nest.

Mr. M'Lachlan mentioned that the galls on the elm which were exhibited by Mr. F. Smith at the previous Meeting (S. S. 566) had been described by Claude Joseph Geoffroy in 1724, and by Réaumur in 1737, the latter of whom gave figures of the gall: De Geer and Etienne Louis Geoffroy (1764) also referred to it, and the insect was the Schizoneura gallarum-ulmi of De Geer.

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* Since described Ent. Mo. Mag. iii. 176, and figured Ent. Ann. 1867, fig. 5.

† Xylina Zinckenii, *Tr.*; see Ent. Ann. 1867, p. 136.

Prof. Westwood exhibited a highly magnified drawing of a monstrous individual of Pieris Pyrrha, a Brazilian butterfly, from the collection of Mr. Hewitson, of which the two wings on the left side of the body and the fore wing and costa of the hind wing on the right side were coloured as in the male (being white on the upper surface with a black tip to the fore wings, thus resembling Pieris Brassicæ), whilst the remainder of the right hind wing was coloured as in the female, thus resembling one of the Heliconiidæ. Prof. Westwood remarked that such a specimen and such a species afforded ground for some comment on the relationship of those mimetic animals which had recently attracted so much attention, and had afforded Mr. Bates materials for a remarkable and elaborate paper in the 'Transactions of the Linnean Society.' Prof. Westwood, in the first place, considered that every species of animal (except in the instances noticed below) was, so far as its habits and economy were concerned, as *independent* of its so-called allied species as if every individual of the latter had ceased to exist; the same might also be affirmed even of the individuals of each species, except,

1st, in the relations of the sexes of each species, and the result of their union;
2nd, in the relation between an individual or species and the animal or vegetable upon which it subsists; and
3rd, in cases of perfect socialism, where many individuals assist in the economy of the society.

This *independence in economy* was the result of similar independence or *isolation in structural relations*, and implied the *genetic distinction* of each species. But naturalists had found it convenient to assume closer or wider degrees of structural affinity as the basis of their classification, derived from the most distinctive character of their various groups, of whatever rank. Thus the Mammalia appropriated to the land, the birds to the air, and the fishes to the water, were characterized at once by the organs which were of the greatest use in enabling them to subsist in their respective elements, and hence a primary importance was attached to the organs of locomotion, and thus groups were formed and characterized, which have been termed classes, orders, families, tribes, genera, &c. It was, however, only upon the greater or less degree of *resemblance*, either of the entire animals or portions of their organs, with those which were associated with them in such groups, that these arrangements were based. Various kinds of resemblance were, however, accepted by naturalists as affording grounds for classification, and while some of these were highly natural, others were very artificial in their nature. Species which agreed together in their most essential characters were regarded as related together by affinity, but others, although bearing a general resemblance, might differ widely in their important organisms: this latter relationship, overlooked by the earlier naturalists, or confounded by them with relations of affinity,* was first clearly pointed out by Mr. W. S. MacLeay, and in fact formed one of the principal key-stones of his system. Instances of this kind of resemblance were then pointed out:

1. Between members of the different kingdoms of nature: Ex. Byrrhus and a bit of earth; the larva of Geometra and a twig; Orchides and insects.

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* As where Ascalaphus, with its long-knobbed antenna, was described as a Papilio.

2. Between different classes of the same kingdom: Ex. Humming-bird and humming-bird moth; eel and snake.
3. Between different orders of the same class: Ex. Vespa and Ceria; Trochilium and Vespa; Eristalis and Apis; Tricondyla and Condylodera.
4. Between different sections of an order: Ex. Papilio and Urapteryx; Carabus and Adelium.
5. Between different families of a section: Ex. Papilio paradoxus and Danais; Leptalis and Heliconia.
6. Between different genera of a family: Ex. Species of various genera of Heliconiidæ.

From the latter instances, the Professor thought it was evident that the relation which had been termed mimetic resemblance was only an exaggerated analogy; and as these analogies (more or less complete) were found to occur throughout nature it might be assumed that they formed an element in creation, and hence that it would be unphilosophical and illogical to refer their occurrence in a more striking degree, in any one instance to a special cause, although the analogy did certainly in many cases seem to be given to the creature for purposes of protection. In the MacLeayian and Swainsonian systems these analogies were considered as existing as tests of affinities, and without regarding or employing them in the sense adopted by the authors of those systems, it seemed to Prof. Westwood that it was necessary to take them into consideration in endeavouring to arrive at a correct view of the general "System of Nature." Applying the preceding observations to the mimicry exhibited by the various Pieridæ (chiefly of the genus Leptalis) of different species of Heliconiidæ described by Mr. Bates, Prof. Westwood contended that Mr. Bates's supposition that the imitation had been assumed by the former in order to enable them to subsist (the Heliconiidæ which possess a strong and disagreeable odour being found to be dominant in South America) was not tenable—

1. Because the mimicking species could barely be said to exist, much less to flourish, in the country where the Heliconiidæ abounded, "not one in a thousand" having been found by Mr. Bates.
2. Because there still occurred numerous species of white Pieridæ in the country of the Heliconiidæ in a flourishing condition.
3. Because there were vast numbers of other groups and species of butterflies in Brazil equally subject to attacks of birds with the Pieridæ, which had never attempted the assumption of forms of the dominant group, Heliconiidæ.
4. Because there were great numbers of instances of mimicry between the different Heliconiidæ themselves, which could not have the inducement to mimicry attributed to the Pieridæ.
5. Because there were species of Pieridæ (such as that to which Mr. Hewitson's mnstrous individual belonged) of which only one sex mimicked the Heliconiidæ. It would require a wide stretch of imagination to suppose that natural selection could have led to the assumption of such mimicry by the individuals of only one of the sexes of a species.*

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* Papilio Æneа exhibts a double system of mimicry, the male resembling Danais Echeria and the female Danais Chrysippus!

6. Because the theory assumed that the Heliconiidæ existed before the attempt at mimicry commenced on the part of the Pieridæ; whereas Mr. Bates' statement would lead to the inference that the Heliconiidæ were so unstable a group that the manufacture of species is still going on among them.
7. Because, according to the doctrine of chances, it was in the highest degree improbable that a casual variation of any given species of Pieridæ should by constant modification, assisted by hereditary descent, gradually assume the form, colour and markings of another species, especially of so remarkable a type as the Heliconiidæ. But for an entire group to be simultaneously engaged in such a process, each species tending towards distinct and equally peculiar species, would by a logician be pronounced impossible. The admission that the God of Nature created these species in their present mimetic condition for some wise but hidden purpose disposed of all difficulty.

Mr. Alfred R. Wallace followed, with an exposition of the theory of mimicry or adaptive resemblances as explaining anomalies of sexual variation. He began by pointing out what was meant by mimicry; when moths or beetles so closely resembled the bark of the trees they were accustomed to rest on that it was difficult to distinguish them, or when the curious Phasmidæ were undistinguishable from the sticks or leaves among which they lived, no one doubted that the resemblance was serviceable to the creature,—it was a protective adaptation. So with the moths of the genus Trochilium, which resembled stinging Hymenoptera, but were themselves helpless sluggish creatures, the protection gained was no less clear; and this was termed mimicry, because one insect was, as it were, dressed to imitate another. Mr. Bates first showed how extensively this prevailed in nature, especially among the Lepidoptera, and argued that if the imitated forms had any special immunity from attack, the species of other groups which resembled them would to some extent be free from attack also, and would thus gain an advantage in the struggle for existence. He then shewed that the forms imitated always belonged to dominant groups, or those excessively abundant in species and individuals, and therefore presumptively free from the attacks of those insect-enemies that kept down the numbers and threatened the extinction of other species; and that in the case of the Danaidæ and Heliconiidæ (the groups most frequently imitated all over the world), the protection was probably the powerful odour they emitted. The theory of natural selection, or the preservation of useful variations, was shown to be fully capable of explaining these facts, and it bore the test of a true theory by also explaining other anomalies as they arose. A species of Diadema was then exhibited, in which the female was glossed with blue, while the male was dull brown, thus reversing the usual sexual characters of the genus; and it was observed that the male in insects was usually more active, the female more sluggish; the male gaily coloured, the female dull; and these facts were connected by the consideration that the female, having to carry a heavy load of ova, and to deposit them in places favourable for their development, required protection for a much longer period than the male, whose duty of fecundation was very speedily performed. Thus dull colours were useful to female insects, since it rendered them less conspicuous. It followed that any other kind of protection would be also more necessary for the female than for the male, and, to show that this really was so, a male specimen of the well-known leaf-insect (*Phyllium*, sp.) was exhibited, having none of that wonderful protective resemblance to a leaf which characterises the female. So in the well-known case of Diadema bolina, the male was a richly-coloured blue, white and black insect, while the female was orange-brown, quite differently marked, and resembled most minutely Danais Chrysippus, which had a range nearly coincident with it. It was suggested that the explanation of the anomalous insect which was the origin of these remarks was, that the female, by acquiring the metallic-blue gloss, was made closely to resemble the common Euplœa Midamus which inhabited the same localities; it thus gained an advantage in being mistaken for a species which insectivorous birds did not attack.

Mr. Bates was of opinion that the individual of Pieris Pyrrha described by Professor Westwood presented simply an instance of unequal hermaphroditism, three-fourths male and one-fourth female. As such it was a mere monstrosity, and had no bearing whatever on the question of the origin of species; the Darwinian theory dealt only with variations that were propagated, and not with monstrosities, the peculiarities of which were not transmitted to their descendants. With regard to those cases where the female sex of a species alone was found to mimic species of other families, the male remaining true to the normal type of its group, he thought it was absolutely necessary that an entomologist should have had opportunities of observing the habits of the species before drawing conclusions concerning them. In all such cases he had found that the females had a different mode of life from the males. In Pieris Pyrrha and other allied species the females were confined to the shades of the forest, where they flew near the ground, and were slow in their movements; whilst the males spent the hours of sunlight flying about open places, in company with the males of a great number of other butterflies; they resorted to the forest shades only towards evening or on cloudy days. The cause of the female of Pieris Pyrrha having been brought to resemble a Heliconid butterfly was the same as that which had drawn out the wonderful mimetic dress of the Leptalides; namely the protection which such resemblance afforded them against the persecutions of insectivorous animals. A more remarkable case than Pieris Pyrrha was that of Papilio Torquatus, a well-known Brazilian butterfly, of light yellow and black colours (in the male). Like the male of Pieris Pyrrha, Papilio Torquatus (male) spent his days in the open sunshine, whilst the female was confined to the shades of the forest, flying heavily and depositing her eggs one by one underneath the leaves of low trees. The female offered the most striking contrast in colours to the male, being black with white spots and crimson macular belt. It was significant that the dominant forms of Papiliones of the forest shades of tropical America had precisely that style of coloration; but the importance of the present case lay in this, that the female Torquatus presented local varieties in the various regions inhabited by the species, the male remaining unchanged, and the varieties were adapted in dress to the species of the dominant Æneas group peculiar to the localities. Thus on the Lower Amazons the form of the female was that which had been named P. Caudius by Hübner, having a white spot on the fore wing, and a crimson belt on the hind wing, precisely as in the females of the common species inhabiting the same region, *e.g.* P. Æneas, P. Parsodes, P. Echelus, P. Ergeteles, &c. On the Upper Amazons, the female was very variable, but the commonest varieties resembled closely the females of the species of the Æneas group most prevalent there, namely, P. Lysander and P. Bolivar: the resemblance to the female Bolivar was most extraordinary, for in that species the crimson macular belt was replaced by yellow. Mr. Bates also made some remarks in answer to the objections which Professor

Westwood had urged against the explanation of these imitative analogies on Darwinian principles. He said that the case of the Leptalides published by him could not, in his opinion, be explained in any other way. The species of Leptalis in question was found in several distant localities; in some of them it existed under one constant local form only, in others it was exceedingly variable, the common varieties showing a wonderful tendency towards a likeness to the predominant species of Ithomia of the respective localities. If the dress now worn by the Leptalis was given it at its creation, as Professor Westwood believed, how would he explain all these numerous shades of variety found in one and the same locality? To be consistent he must say that each variation was lineally descended from an originally created variety, which would be absurd, as so many species are known to offer numerous similar varieties in one and the same brood. As some of these varieties of Leptalis resembled species of Ithomia peculiar to the locality more than their sister varieties did, the conclusion was simple and natural, that, the imitation being a rule in all other localities, the process was there at work by which the close imitation was brought about. The less exact imitations were in course of time destroyed without bringing forth progeny, and then the state of things was identical with what was found in other localities, namely, one or more constant forms of Leptalis resembling closely their companion Ithomiæ.

Dr. Sharp remarked that whether the resemblances under discussion were purely accidental or not could be determined by a numerical investigation, by ascertaining what proportion the cases in which species resembling one another occurred in company bore to the cases in which species with a similar amount of resemblance occurred away from one another. He thought, however, that some of the cases of mimicry might be accounted for on other grounds than those supported by Messrs. Wallace and Bates, for if the Darwinian theory of a common descent were true, then the laws and principles of heredity could be applied to different species, as they have heretefore been to individuals. He proposed four classes, under each of which he believed some of these resemblances could be placed:—

1st. Resemblances purely accidental; for the doctrine of chances would show that if there were in the world a sufficient number of species resembling one another, a greater or less number of these would be sure to occur in company.

2nd. Resemblances the result of a descent from a common parent; for it being understood that a certain character would be transmitted from parent to offspring through an indefinite number of generations, unless circumstances tending to alter it were brought to bear on that character, it could readily be perceived that some species of Lepidoptera might resemble one another in coloration, by reason of the resemblance of each to a common parent similarly coloured.

3rd. Resemblances the result of exposure to similar circumstances; for undoubtedly, if the Darwinian theory were true, the coloration of species of Lepidoptera must be referred sooner or later to external causes operating on the organism. But the cases where mimicry occurred were cases in which the species, being constantly found together, were necessarily to a very great extent subjected to the same external conditions. Thus in a certain locality a species of Leptalis was found closely resembling a species of Heliconia, and in another locality a second and allied species of Heliconia was found. Mr. Wallace would say that this Heliconia differed from the first Heliconia because of the changed circumstances to which it was exposed: but with this second species of Heliconia was found a second species of Leptalis, differing from the first species of Leptalis in nearly the same manner as the second species of Heliconia differed from the first, and this was easily comprehensible, its companionship with the Heliconia having exposed it to exactly the same disturbing influences.

4th. This class was that to which Messrs. Bates and Wallace referred all these resemblances, and it was the only one that could correctly be spoken of as mimicry; the colour of the Heliconia, without any reference to common descent or to the operation of similar external agencies, being the determining cause of the colour of the Leptalis.

Paper read.

Messrs. Crotch and Sharp read a joint paper entitled 'Additions to the Catalogue of British Coleoptera, with Descriptions of New Species." The additions were no less than seventy-one in number, the whole of which were exhibited; of these sixty had been described by continental authors, and eleven, belonging to the genera Ptilium, Atomaria, Telephorus, Sitones, Anthicus, Gyrophæna, Philonthus, Lathrobium and Stenus, were characterized as new to Science.

December 3, 1866.—Sir JOHN LUBBOCK, Bart., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Mémoires de la Société Linnéenne de Normandie,' Vol. xiii. and xiv.; 'Bulletin de la Société Linnéenne de Normandie,' Vol. x.; presented by the Society. 'Etudes Hymenopterologiques,' par J. Sichel: by the Author. 'Memoir of the late Stephen Stone, Esq., F.S.A., &c., of Brighthampton, Oxon;' by Prof. Westwood. 'The Zoologist' for December; by the Editor. 'The Entomologist's Monthly Magazine' for December; by the Editors.

The following additions by purchase were also announced:—'Zoological Record,' Vols. i. and ii. 'British Beetles,' by E. C. Rye. 'British Bees,' by W. E. Shuckard.

Election of Members.

E. T. Higgins, Esq., of 24, Bloomsbury Street, and Andrew Swanzy, Esq., of 122, Cannon Street, were elected Members; H. L. Schrader, Esq., of Shanghai, a Foreign Member; and F. Lovell Keays, Esq, of 4, Harringay Villas, N., and Walter Thornborrow, Esq., of 4, Provost Road, N.W., Annual Subscribers.

Exhibitions, &c.

Mr. Stainton exhibited living specimens of Gracilaria scalariella, bred from larvæ mining in the leaves of Echium vulgare at Cannes, which he had received a fortnight ago from M. Millière.

Mr. Stainton also exhibited a flat pouch-like gall formed on the leaves of Pistacia lentiscus apparently by Aphides, but which was inhabited by a Phycideous larva. This he had received from Mr. J. T. Moggridge, who met with it at Mentone.

Mr. Janson exhibited a collection of insects, chiefly Coleoptera, made by Mr. W. Hume in the neighbourhood of Rio de Janeiro.

Mr. W. F. Evans sent for exhibition a number of insects found in wool imported from New Zealand, accompanied by the following note:—

"Some time ago I brought under the notice of the Society the circumstance of the large number of Pyronota festiva found in wool imported from New Zealand. Since then I have requested my friend to continue sending me every insect which might be found in the fleeces from that locality, and now beg to exhibit the various insects, larvæ, animals, a seed and a shell, &c., &c., which have been thus found. The Pyronota seems to be in the greatest profusion, and the specimens vary very much in colour."

Mr. Duer (who was present as a visitor) exhibited a pupa of Vanessa, having some extraordinary projections from both wing-cases.

Dr. Sharp exhibited specimens of Stenus major, *Mulsant*, taken at Southend: this insect was new to our Fauna, and was hitherto known only as a native of the South of France.

Prof. Westwood mentioned that the late Mr. Stephen Stone, of Brighthampton, had bequeathed his valuable collection of wasps' nests and other natural objects to the Oxford Museum.

Prof. Westwood read the following letter from Mr. Edward Holdsworth, dated Shanghai, July 20, 1866:—

"I trust you will pardon my taking this liberty, but my excuse is this,—reading your revised edition of Dru Drury's 'Exotic Entomology,' the other day, I noticed you remarked that no authenticated description of Actias Luna had been sent to you: as I have reared several specimens this summer I am able to give you a correct description of this larva. As soon as hatched the worm is reddish brown, with two black bands round its body and several black spots: after the first change it is reddish brown, with fleshy points all over its side and back, each point surmounted with a black spot and one thin white hair. In two or three days the larva changes to a yellowish red colour, a sign that it is about to pass to its second skin: after this change it appears of a light yellowish green colour, the fleshy points (mentioned before) are yellow, and each is surmounted with one brownish hair. On the head are four large fleshy points, which are each surrounded by a black ring, below the extreme tip, which is yellow. After the next change the four major spots on the head and the one at the end of the back are now very large, and have seven short hairs or bristles sticking out at the ends. This is the last change, and the larva is now about two and a half or three inches in length, and fully one inch in diameter. It is fairly common in the neighbourhood of Shanghai, and always found feeding on privet. Those I reared I fed with willow, and they thrived very well on it. It spins a very large cocoon, fully two and a half inches long, but with too much gum about it to allow the silk to be made use of. The caterpillar has down its back two straight lines or ridges of fleshy lumps, which terminate with a single lump placed over the joint of the last leg and in the centre of the back: along each side and just above the legs is a yellowish line, running the length of the body and terminating at the fleshy lump placed on the side of the last leg. The vent and outsides of the two last legs (right and left) are of a very deep plum-colour. In this change the black rings on the four major fleshy lumps on the head almost fade away, and the caterpillar is well covered all over with thin hairs about one-eighth of an inch long: at the base of each leg is a yellow spot, and over the mouth are four spots or fleshy lumps forming a crescent. Now comes the fourth change, and the larva is now about two inches long: the fleshy lumps on the back and sides have changed to reddish yellow, with a black ring on the top of each lump and four black short hairs also: on each side of the light-coloured line on the side of the larva are little reddish yellow spots, and on the line at the base of each leg are diamond-shaped marks, the inside yellow and the outer mark dark red: the legs and under part of the body are of a beautiful dark green, the sides a lighter green, and the back much lighter still and covered with white hairs; the legs are covered with black hair, and all the fleshy lumps with four or five black bristles.

"There can be no mistake about the larva I have described, for those I have reared have now come out of their cocoons, and the moth is a white-green, with one spot on each wing, two under wings swallow-tailed; a pink or rather reddish pink line borders the top of the upper wings and crosses the head; the body covered with white down."

Prof. Westwood added that Mr. Holdsworth had mistaken the Asiatic Actias Selene for the North American A. Luna: the larva of the Indian species was figured in the fifth volume of the Society's 'Transactions' (pl. v.), from a drawing by Captain Hutton: it was desirable to see the perfect insect, as there appeared to be several local races of it.

Prof. Westwood exhibited a series of specimens of Liparis dispar, reared from the egg-state by Mr. Briggs, of St. John's College, Oxford, illustrating not only a remarkable variation, according to the nature of the food of the larvæ, but also showing a strong tendency to degeneration. The progenitors of these specimens, two or three generations back, had been obtained wild in Yorkshire, and were of moderate size (not so large, however, as the specimens formerly taken in such quantities at Whittlesea Mere). The eggs were received in October, 1865, and the caterpillars hatched during the first half of the following May. The caterpillars were divided into two groups, those composing one of which were fed exclusively on elm, and the others exclusively on whitethorn. The caterpillars spun up between the 5th and 18th of July. No perceptible variation was observed in the larvæ, cocoons or pupæ of the two divisions. The males in both divisions began to hatch on the 18th of July, but the females did not appear until half the males were already hatched. Almost all the males in both divisions were fully developed, only two cripples appearing out of the thirty-two fed upon elm. The males fed on elm averaged one inch and five-twelfths in the expansion of their fore wings: they were uniformly coloured, much darker and richer than the males fed on the whitethorn, the dark markings on the fore wings were strongly defined, the ground colour of these wings was also darker; the hind wings were reddish brown. The males fed on the hawthorn were considerably smaller, averaging only one inch and two-twelfths in expanse; the ground colour of all their wings was paler and grayer than in the others, but the markings of the fore wings were generally well defined. A few of the males in each division were considerably smaller than the specimens exhibited. In the elm-fed females fourteen out of sixteen were crippled, with their wings not properly developed, and even the other two were slightly crippled: they were not so large as those of the hawthorn-fed larvæ. Having been impregnated by the males, none of these females deposited eggs, although they pulled off the down from their tails and fixed it in tufts in the box, after the manner adopted by ordinary females of this species in the act of oviposition. Of the whitethorn-fed females less than one half were crippled, and these were not generally so much crippled as the elm-fed females. This experiment seemed to prove that had the species depended solely on the existence of the elm-fed individuals it would have become extinct; whilst the smaller size of the males of the hawthorn-fed group showed that even amongst them (the females of which were so much better developed than the elm-fed ones) the principle of degeneration had set in, and that it would have been very improbable that a distinct phytophagic race or sub-species would have been effectually produced.

Mr. M'Lachlan remarked that Liparis dispar was scarcely a fair subject on which to experimentalize and theorize, inasmuch as it now existed in this country only in a semi-domesticated state.

Mr. Bates, referring to the discussion which had taken place at the previous Meeting (S. S. 571) respecting mimetic resemblances, introduced Mr. T. Belt, the gentleman who had favoured him with many of the facts, as to the aversion of insectivorous birds to the Heliconiidæ, which were referred to on the former occasion, and in Mr. Bates' paper in the Linnean Transactions.

Mr. T. Belt gave a detailed narration of his observations on this subject, and stated that not only were the perfect insects of Heliconia protected by their unpleasant odour, but that the larvæ also were rejected by fowls.

Mr. Stainton remarked that a curious instance of the dislike which birds seemed to have for certain insects had come under his observation some eighteen years previously. When he was attracting moths by light, he had often such numerous attendances that he had frequently captured fifty Noctuæ, or more, in a quarter of an hour; whatever came must be caught, or it was in the way, and, in order to ascertain most readily whether there was anything of value, Mr. Stainton adopted the plan of smothering the whole lot with the fumes of sulphur. When the operation had been performed, more than nine-tenths of the dead insects would probably be Agrotis exclamationis. He thus had a vast store of useless dead moths, which he disposed of by giving them to the poultry, the young turkeys particularly enjoying them in spite of their flavour of sulphur. On one occasion, amongst a number of A. exclamationis, there was one specimen of Spilosoma Menthastri, and though not one of the young turkeys rejected a single A. exclamationis, they each in succession took up the S. Menthastri and put it down again, and it was left, conspicuous as it was, on the ground. This insect, it was well known, had a peculiarly disagreeable odour.

Mr. J. J. Weir had frequently noticed that cage-birds refused the larvæ both of Spilosoma Menthastri and S. lubricipeda.

Prof. Westwood stated that a fluid of very disagreeable odour was emitted by those insects from behind the collar; this was probably similar to that ejected by many of the Chrysomelidæ. He inquired whether anything of the kind had been observed in the Heliconiidæ.

Mr. Bates said that one group of Heliconiidæ was furnished at the apex of the abdomen with a process from which, when the abdomen was pressed, a very disagreeable odour was exhaled; but he had never seen any fluid ejected.

Mr. McLachlan remarked, as bearing upon the theory of Natural Selection, that having recently been engaged in an examination of the British Psocidæ, in which family the generic or sectional characters were principally grounded on the neuration, he had found occasional instances of aberration in the arrangement of the veins: these aberrations consisted in one wing of an insect which belonged to a particular genus or section assuming, entirely or partially, the neural characters of another genus or section; in no case, among several hundred examples, did he find neural variation which was strictly abnormal.

Dr. Sharp offered some criticisms on the theory advanced by Messrs. Bates and Wallace, and argued —

1st. That natural selection was a power of differentiation, and, although it was quite possible that a differentiating power might work so as to produce resemblances, it was at first sight improbable that it should do so; and more evidence was required of the truth of a paradox than a truism.

2nd. It must be shown that animals possessing the so-called mimetic resemblances occurred far more frequently in company with one another than away from one another. But if this were shown, a single case of such resemblance between animals living in different localities would throw doubt on the theory, by suggesting that there was, probably, some more comprehensive law which would account for *all* those resemblances.

3rd. It must be shown that the cause of the rarity of the Leptalis was one acting on the insect entirely or chiefly while it was in the perfect state; this had not been done, and it was improbable that it could be; for the most critical periods in the life of Lepidoptera, as regarded their enemies, were the larval and pupal states.

4th. It must be shown that the enemy (whatever it might be) which attacked the Leptalis sought its prey principally by the sense of sight; but this suggested another improbability. If the Heliconia, which the Leptalis resembled, was protected by its nasty odour, surely the bird or other enemy of the Leptalis must be very foolish to let *it* escape when it smelt nice, because it *looked* like the Heliconia. The purpose of protection would have been better accomplished by the Leptalis mimicking the Heliconia in that point by which the Heliconia was protected.

5th. A forcible objection to the mimicry theory (as already pointed out by Prof. Westwood) was the rarity of the mimicking species. The theory involved the hypothesis that there was a time when the Leptalis differed in pattern from the Heliconia; was the Heliconia then commoner than now, or as rare? If commoner, it was curious that, when not protected, it flourished better than now, when protected. If as rare, how could it have survived at all before and during its transmutation? It would, perhaps, be suggested that the Leptalis was formerly commoner than now, and that some enemy arose, rendering it necessary that the Leptalis should find a new means of defence. This, however, was mere supposition, and it was almost impossible to adduce facts to prove it; but supposing it to be the case, why did not the enemy exterminate the Leptalis when it did not resemble the Heliconia, as (according to the theory) it would now, but for this resemblance. The further supposition must be made, that the enemy was not at first very dangerous to the Leptalis, and that in proportion as it grew dangerous, the Leptalis grew more and more to resemble the Heliconia: it was certainly very fortunate for the Leptalis that spontaneous variations, bringing it to resemble the Heliconia, should occur in the exact proportion required for its safety.

6th. Again, taking the time when the Leptalis differed in pattern from the Heliconia, it was said that specimens exhibiting small variations approximating to the Heliconia were selected for the preservation of the species. But a small variation in marking would be of no practical service to the Leptalis, especially as it was by its nasty *odour* that the Heliconia was protected; to which it might be added that on the theory of Natural Selection no reason or fact was brought forward to induce the belief that variations of the required sort should occur at all.

In conclusion, whilst admitting the impossibility that such a theory as that of mimetic resemblances could ever be shown by facts to be correct at all points, Dr. Sharp was of opinion that the evidence as yet adduced was insufficient to convince an unprejudiced observer. The most that could at present be said of the theory was, that it was very ingenious, and might or might not be true.

Mr. Wallace, in replying to Dr. Sharp, remarked that it was very easy to make objections to any theory, and many of those advanced were of such a general nature that it would require the whole subject to be again fully gone into to answer them in detail. The first objection was one of those vague and general statements which was really no objection at all; it was said that natural selection being a power of *differentiation*, was therefore not likely to produce *similarity!* But natural selection was more than a power of differentiation; it was the preservation and accumulation of *useful variations;* and the moment it became useful to one creature to resemble another, all variations which tended to make it so would be preserved, and would accumulate till an outward similarity was produced. In answer to the second objection, Mr. Wallace admitted that it must be shown that pairs of mimetic insects occurred together more frequently than apart, and maintained that this had been shown: he denied that a single case of mimicry by insects of different countries would discredit the general explanation; since in *one case* the resemblance might easily be accidental, or recent changes of distribution might have parted creatures that once lived together. But, however this might be, even one case of mimicry among insects from distinct countries (as complete and striking as many of those adduced by Mr. Bates and the speaker) had not yet been produced by the opponents of the theory. Dr. Sharp, as a third objection, required proof that the scarcity of Leptalis was owing to persecution in the perfect state, not in the larval or pupal conditions; probably Dr. Sharp could not give such proof in the case of a scarce British insect which he had studied for years, and it was quite immaterial to the question. The Leptalides alone of all Pieridæ were universally scarce in individuals, and almost all the Leptalides, and they alone, mimic Heliconiidæ. As to requiring proof that birds seek their prey by the sense of sight, it was so generally admitted that insectivorous birds captured their prey by sight, that if Dr. Sharp denied it he should rather prove that they do not. In the next place, it was asked, "Was the Leptalis, before it resembled the Heliconia, abundant or rare? If abundant, then it was better off without protection than with it. If rare, how did it survive at all before and during transformation?" The reply was, that before the Leptalides began to mimic the Heliconiæ they were more abundant than now, and like nations and individuals, they were better off when they did not require protection, than now when they cannot exist without it. The Leptalides were not now the same insects they were then, and their conditions of existence had also materially changed since that remote epoch. Lastly, it was said that as the Heliconiæ were protected by their disagreeable odour, a superficial resemblance to the Heliconiæ could not be at first a sufficient motive power to change the species of the Leptalides. Mr. Wallace thought, on the contrary, that it would, because it was self-evident that under all circumstances the "fittest must survive," and any variation which caused but a small percentage of individuals to escape destruction would to that extent benefit that variety, and might, when the species was struggling for existence, cause that variety alone to survive. To deny this would be to deny that insectivorous birds could ever be deceived by slight resemblances, although it was well known that very rude resemblances sometimes deceived animals and even men. Mr. Wallace thought, therefore, that the theory of the "survival of the fittest" (or natural selection) did offer an explanation of almost every fact connected with mimicking insects, and that the objections that had been made to it were of a vague nature, and such as could be made against any theory whatever that attempted to explain the phenomena of organic life. Our knowledge of the present life-history of insects was exceedingly imperfect, and how many questions might be asked concerning them that no one could answer. In the long life-history of species how much more must ever remain unknown; yet because our knowledge was thus incomplete we should be the more thankful for such a theory as that of Mr. Darwin, which supplies a real cause of modification of species, and enables us to correlate so many of the most curious phenomena of organic existences, and to comprehend the series of actions and reactions by which they have most probably been brought about.

Prof. Westwood reiterated, with further illustrations, some of the objections to the theory stated by him at the previous Meeting, and the discussion was brought to a close by a few remarks from the President.

Paper read.

Mr. M'Lachlan read a paper entitled "A new Genus of Hemerobidæ, and a new Genus of Perlidæ." The former was described under the name of Rapisma, and the type was the Hemerobius viridipennis of Walker; the latter under the name of Stenoperla, and the type was the Chloroperla prasina of Newman.

January 7, 1867.—Sir JOHN LUBBOCK, Bart., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:— 'Mémoires de la Société de Physique et d'Histoire Naturelle de Genève,' Vol. xviii. pt. 2; presented by the Society. 'Exotic Butterflies,' Part 61; by W. W. Saunders, Esq. 'Notes on on the Zygænidæ of Cuba,' by Augustus Radcliffe Grote; by the Author. 'Lepidopterological Contributions,' by Aug. R. Grote and Coleman T. Robinson; by the Authors. 'Note on the Japan Silkworm,' by Captain Thomas Hutton; by the Author. 'De Tunnelgravende Biller Bledius, Heterocerus, Dyschirius og deres Danske Arter,' 'Danmarks Cerambyces,' 'Danmarks Buprestes og Elateres,' 'Krebsdyrenes Sugemund, I. Cymothoæ,' 'Phthiriasis og Mundens Bygning hos Pediculus,' by J. C. Schiödte; by the Author. 'Danmarks Geophiler,' by Bergsöe and Meinert; by the Authors. 'Om Slaegten Stalita,' by the Editor of 'Naturhistorisk Tidsskrift.' 'The

Entomologist's Annual;' by H. T. Stainton, Esq. 'The Zoologist' for January; by the Editor. 'The Entomologist's Monthly Magazine' for January; by the Editors.

The following addition by purchase was also announced:—Buicht über die Wissenschaftlichen Leistungen im Gebiete der Entomologie während der Jahre 1863 und 1864,' von Dr. A. Gerstaecker; Erste Hälfte.

Election of Subscriber.

Samuel Alfred Davis, Esq., of 4, Durham-place West, Holloway, was ballotted for, and elected an Annual Subscriber.

Exhibitions, &c.

Prof. Westwood exhibited a number of butterflies, chiefly Heliconiidæ, collected by Dr. Burchell in Central South America, and observed that the Burchell collection was peculiarly interesting, from the fact that each specimen bore a ticket giving the date (sometimes even the hour of the day) and the precise locality of capture, so that the range of particular forms could be traced, and the limits thereof fixed with accuracy.

Mr. M'Lachlan asked the reason why humming-bird hawk-moths (*Macroglossa stellatarum*) chased up and down stone walls, banks, or cliffs, but particularly stone walls near the sea; dozens of specimens might frequently be seen so doing, and in positions far removed from any flowers. No answer was given to the inquiry; but Mr. F. Smith mentioned that he had had sent to him from the Isle of Wight some clay nests extracted from a wall, which eventually produced hymenopterous insects, but which were said by the sender to be formed by the humming-bird-hawk. It seemed probable that his correspondent had noticed the moths performing in the manner described by Mr. M'Lachlan in the neighbourhood of the nests, and had thence erroneously inferred that the nests were the workmanship of the moths.

Mr. A. E. Eaton mentioned that he had, during the past season, found near Lyndhurst a hornet's nest in a very unusual situation, namely, in a bank composed of sandy soil where no wood was near. The colony was a strong one, and the nest so deeply imbedded in the bank that he had been unable to take it.

Mr. M'Lachlan said that, since the previous Meeting, at which he had stated that Liparis dispar existed in this country only in a semi-domesticated condition (S. S. 579), he had written to Mr. Doubleday on the subject, and that gentleman replied as follows:—"I do not know of any locality in Britain where it occurs in a state of nature, and I am strongly of opinion that it has only been found in the fens round Yaxley; when I was there in 1839 the larvæ swarmed on the gale and dwarf sallows. English was there in 1846, and he found the larvæ pretty common, but not so abundant as they were in 1839. Haworth simply says, 'In salicetis, rarissime.' I believe all the specimens which were placed in the old collections were continental, or reared from eggs brought from the Continent, as they were very different from the fen specimens, and just like those found in France; and I think most of those now bred in this country are of continental origin. I once collected a great quantity of the pupæ in Paris, and brought them home to Epping. The following spring I turned out thousands of larvæ, but they did not establish themselves, although I saw plenty of the moths in one field in August. In 1846 I obtained an immense quantity of eggs from moths bred from larvæ brought from Yaxley. Next spring great numbers of larvæ were turned out on the dwarf sallows growing among the gravel-pits in the Forest. A few larvæ were seen the following year, but not afterwards. It is very strange that a moth which frequents towns and suburban gardens on the Continent should be found in such a very different locality here. In France the larvæ appeared to feed principally on the elm."

Prof. Westwood repeated that Mr. Briggs' specimens (S. S. 578) were the descendants, only three or four generations removed, of ancestors which were captured in a state of freedom.

Captain T. Hutton, of Mussooree, communicated a "Note on the Japan Silkworm," in which he expressed his opinion that Bombyx Yamamai is nothing more than a hybrid between a sickly and degenerate race of B. Mori and the little monthly-worm, B. Sinensis, and repeated his conviction that, for the purpose of renewing the European stock, experienced entomologists should be deputed to visit different parts of China, with a view to the re-discovery of the silkworm in its natural state of freedom.

Papers read.

The following papers were read: "Choreutidæ and Crambina collected in Egypt in 1864, and Crambina, Pterophorina, and Alucitina collected in Palestine in 1865, by the Rev. O. Pickard-Cambridge; determined and the new species described, by Professor Zeller; the German descriptions translated into English by H. T. Stainton;" and "A Monograph of the genus Hestia, and descriptions of forms not hitherto noticed; with a tabular view of the Danaidæ and remarks on their natural affinities. By A. G. Butler, F.Z.S., Assistant in the Zoological Department of the British Museum."

New Part of 'Transactions.'

Part 4 of Vol. v. of the "Transactions" (third series), published in December, 1866, and being the fifth Part issued during that year, was on the table.—*J. W. D.*

A Review of Systems. By JAMES EDMUND HARTING, Esq., F.Z.S.

SETTING out with the conviction that all systems must be artificial, and that there is no "natural system," properly so called, we experience some difficulty in making choice of one upon which to classify our British birds. In a former communication I alluded to having studied eighteen "systems" with a view to select the most simple and natural. The notes which I made at the time, now several years ago, have lately turned up with some other memoranda, and thinking that they may perhaps be of service or interest to others who may be in search of a system, I send them to you. As you will observe they are arranged chronologically, commencing with the system of Willughby, he being the first naturalist who treated the study of birds as a science, and the first who made anything like a rational classification.

Willughby's, 1678.—Although by no means complete, yet unquestionably the best that had hitherto been promulgated, and meritorious from the fact of its being framed nearly two centuries ago, with no other assistance than the meagre compilations of preceding authors. It is also without doubt the basis on which the ornithological classification of Linnæus was founded. Nevertheless, it is confused, obscure and full of errors, especially as regards the water birds. The distinction, however, between the land and water birds is well preserved.

Brisson's, 1760.—Unnecessarily long, no less than twenty-six orders and one hundred and fifteen genera, and too fantastical in the characteristics of the orders. Moreover, birds belonging, naturally, to the same genus have been placed not only in different genera, but even in different orders.

Linnæus', 1766.—Violation of natural order in division of land or perching birds into two orders placed wide apart, and the introduction of aquatic orders between. In this respect inferior to Willughby. Nevertheless the best artificial arrangement.

Latham's, 1790.—Commendable for its brevity, nine orders, but containing what would now be considered mistakes. For instance, Recurvirostra placed in order Palmipedes, instead of Grallatores: Glareola, although placed by some (and amongst others Latham) in order Grallatores, and by others in order Palmipedes, should, I take it, be found in neither, for having some characteristics of each, as well as others peculiar to itself, it should more correctly hold a separate and intermediate rank.

Lacépède's, 1799.—Longer even than Brisson's, having no less than thirty-nine orders and one hundred and thirty genera. Very confused, too, and difficult to remember, and this is an essential point. The characteristics of the various orders appear too fantastical, and several orders might very well be comprised in one, for in the chief features they agree, but apparently because they do not agree in one or two trifling details Lacépède has separated them.

Dumeril's, 1806.—Somewhat similar to the more recent classification of Yarrell, but differing in several respects and inconsistent in many others. Yarrell has five orders, Dumeril six, the additional order being that of "Grimpeurs" (Scansores), from which, however, he omits Certhia, and places it not only in a different order, but in the same family as Alcedo! He omits Sylvia, Parus, Motacilla and

Anthus from the Dentirostres, and also omits Alauda from the Conirostres, and places Parus (Dentirostres) and Alauda (Conirostres) in one and the same (a distinct) family. He has Rallus, Hæmatopus and Fulica, in the same family, and makes other mistakes of a like nature. Perhaps they ought hardly to be called mistakes, if we consider that in a classification of this kind there is no standard with which to compare, and therefore the author is at liberty to classify according to his own ideas of the requisitions necessary to constitute affinity between species, genera, &c. Still it appears somewhat odd to place a bird like the coot, which is lobe-footed, with comparatively short legs, wings and bill, in the same family with the oystercatcher, a wader with long legs, wings and bill, together with the rail, which has nearly opposite characteristics, and very different habits. Such a system, therefore, to say the least of it, is unsatisfactory; and to several other systems the same term may be applied.

Meyer's, 1810.—Eleven orders; ten families. Commendable for brevity and general divisions, and comparatively easy to remember.

Illiger's, 1810.—Seven orders; forty-one families; fifteen genera. Complicated with unnecessary and erroneous divisions: for example, why place Sturnus and Sitta in the same family?

Temminck's, 1815.—Fifteen orders; eighty-nine genera; three hundred and thirty-seven species (British). Much to be commended. Very clear and precise in general divisions. Frequently adopted in correspondence with continental naturalists, as being the system usually followed abroad.

Blainville's, 1815.—Fantastical and long since discarded.

Vieillot's, 1816.—Does not apply with sufficient exclusiveness to British birds. In length outrageous; five orders, nine tribes, fifty-eight families, two hundred and seventy-three genera, and heaven knows how many species.

Cuvier's, 1817.—Very long, with unnecessary divisions and distinctions. Moreover, does not apply with sufficient exclusiveness to British birds.

Macleay's, 1818.—"The Quinary System," or "System of Circles." The first and fundamental principle inculcated by Macleay and his disciples is, that all Nature moves in a circle, and that the series of beings is unbroken; and, secondly, that each group and each species has a double affinity. Everyone of the higher groups has a binary division, *viz.* the normal or typical, and the aberrant, the former containing two, and the latter three of the five sub-divisions of which each of the higher groups is composed.

"We cannot here explain the doctrine of *analogy*,—which is wholly distinct from *affinity*,—but we will give an instance of it. The hedge sparrow in the Sylviadæ represents the house sparrow in the Fringillidæ; that is, the one bears the same relation to the Sylviadæ that the other does to the Fringillidæ, and hence they are said to bear an analogy to each other. The whole zoological series, before arranged in a simple chain, according to this system revolves in an almost infinite number of circles around man, from whom they may be said to degrade on all sides." So says a disciple of Macleay.

An opponent of his system writes as follows:—"In Natural History we have always good reason for suspecting methods, and still more for suspecting principles. The doctrine of *types*, if I comprehend it aright, is one of those suspicious principles, being evidently a shoot from Plato's wild theory of pre-existent ideas, or the archetypes of all things, and more directly borrowed from the atheistic system of Robinet. His doctrine bears that Nature's grand aim was to make man, and being incapable of doing so at once, undertook an apprenticeship (*apprentisage*) of experiments, by making various types of his several organs; such as the hand-shaped roots of some of the Orchis family, the brain-stone coral, and the stink-horn (*Phallus fœtidus*), of many of which he gives figures. "A stone," he says, "an oak, a horse, a monkey, a man, are only graduated variations of a *prototype* which has begun to be realized by the least possible elements. A stone, an oak, a horse, are not men, but they can be regarded as *types*, more or less conformable to the same primitive design, and they are all the product of the same idea, more or less *developed*."

In other words, we are expected, upon this principle, to dismiss the conviction (which seems to me an inevitable one) that every object in Nature is a distinct and independent creation of an omnipotent Creator, and accept in its stead the belief that an *inferior* being is capable of transforming itself to a *superior* one, "by development," independently of divine agency!

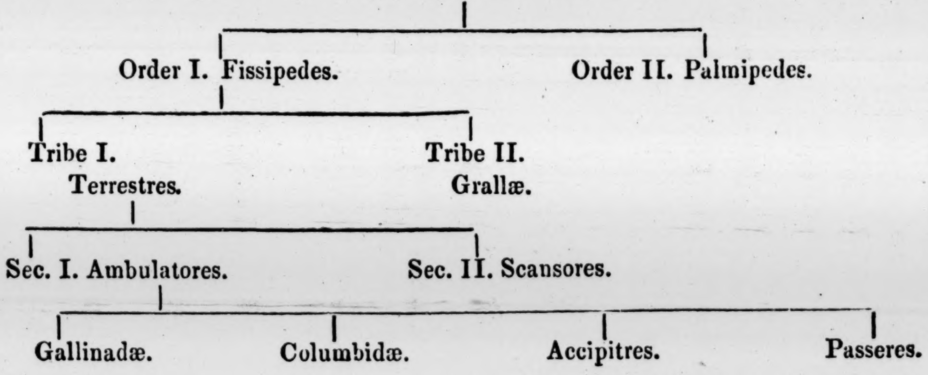
The idea that in Nature there is a chain of succession, and that between every alternate species there is one which forms a connecting link between them, is no doubt a beautiful one, but it is at the same time only speculative, and an examination of facts shows us that the chain cannot be continued unbroken. In this respect, therefore, the system is a defective one, but it is mainly upon the principles which it inculcates, as tending to atheism, that I take leave to reject it.*

Vigors', 1825. The Quinary System, just mentioned, discovered by Macleay in 1818, was elucidated by Vigors in 1825, in a paper "On the Affinities which connect the Orders and Families of Birds" published in the 'Transactions of the Linnæan Society.' Enough has been advanced, however, in the last page to show the objections to this system. It embraces five orders of the same denomination as Yarrell's—*viz.* Raptores, Insessores, Rasores, Grallatores and Natatores. But not content with dividing an order into families, genera and species, the author must needs subdivide orders into tribes; tribes into families: families into sub-families (which in some cases are very numerous); sub-families into genera; and these again into species: so that the division seems endless, and is in consequence confusing. This classification includes five orders; five tribes; forty-five families; sixty subfamilies; four hundred and four genera! the number of species we have not attempted to count.

Latreille's, 1825. Deux sections; 1re terrestres; 2me aquatiques; 7 ordres; 30 fam.; 252 gen.! Je crois que c'est un système dont on n'a pas fait beaucoup d'usage. On y trouve plusieurs fautes: par exemple, M. Latreille a placé le genre *Mésange* (Dentirostres) en même famille que le genre *Alouette* (Conirostres).

Lesson's 1828. Scarcely applicable without much substitution to British birds.

Fleming's, 1828.



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* I have thus dilated upon the "Quinary System," because in a recent number of the 'Zoologist' it was stated, in a review of my 'Birds of Middlesex,' that I had adopted it in that work. So far from that being the case, I entirely disapprove it. Moreover, I was careful to state, in the Introduction, whose system it was that I had adopted.—*J. E. H.*

This table speaks for itself. The division of orders into tribes, tribes into sections, sections into families, which in their turn are subdivided into genera and species, renders the system unnecessarily long and complex.

Yarrell's, 1845.—This system is now probably too well known to require comment. Its simplicity, comparative brevity and perspicuity will commend it to every British naturalist. To those yet unacquainted with the classification therein adopted the following outline will be useful:—

Order I. RAPTORES.

Family I. Vulturidæ.
„ II. Falconidæ.
„ III. Strigidæ.

Order II. INSESSORES.

(Group 1. *Dentirostres.*)

Family I. Laniadæ.
„ II. Muscicapidæ.
„ III. Merulidæ.
„ IV. Sylviadæ.
„ V. Paridæ.
„ VI. Ampelidæ.
„ VII. Motacillidæ.
„ VIII. Anthidæ.

(Group 2. *Conirostres.*)

Family I. Alaudidæ.
„ II. Emberizidæ.
„ III. Fringillidæ.
„ IV. Sturnidæ.
„ V. Corvidæ.

(Group 3. *Scansores.*)

Family I. Picidæ.
„ II. Certhiadæ.
„ III. Cuculidæ.

(Group 4. *Fissirostres.*)

Family I. Meropidæ.
„ II. Halcyonidæ.
„ III. Hirundinidæ.
„ IV. Caprimulgidæ.

Order III. RASORES.

Family I. Columbidæ.
„ II. Phasianidæ.
„ III. Tetraonidæ.
„ IV. Struthionidæ.

Order IV. GRALLATORES.

Family I. Charadriidæ.
„ II. Gruidæ.
„ III. Ardeidæ.
„ IV. Scolopacidæ.
„ V. Rallidæ.
„ VI. Lobipedidæ.

Order V. NATATORES.

Family I. Anatidæ.
„ II. Colymbidæ.
„ III. Alcadæ.
„ IV. Pelecanidæ.
„ V. Laridæ.

J. E. HARTING.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from S. S. 548).

NOVEMBER—DECEMBER, 1866.

Shorteared Owl.—Have heard of six of these owls having been lately shot in this neighbourhood, their bold and fearless natures rendering them peculiarly subject to the attentions of the roving gunners, and it is too probable that out of the many which visit the eastern counties in the autumn and winter, but few return to their northern breeding-grounds. I saw one of these owls on the 3rd of November, near the Humber, perched on a sod, walking up to within three yards before it took wing, and then it scarcely flew out of gunshot. No wonder that such numbers find their way to the local bird-stuffers.

Common Buzzard.—Lately inspected a magnificent specimen of this now rare bird, which had been trapped, by the gamekeeper, in a neighbouring parish: it was an old bird, and in very rich dark-coloured plumage.

Little Stint.—This species has been far from uncommon during the autumn on the "flats." On the 3rd of November noticed several feeding in company with dunlins and ringed dotterels, but was not able to get near them. On the 5th I had a very favourable opportunity of watching one of these minute Tringæ, in company with a dunlin and ringed dotterel, actively engaged in probing the soft "warp" at the foot of the embankment, and now made certain of procuring a specimen, yet, although the No. 5 marked a ring all round it, the little fellow flew off apparently uninjured.

Green and Golden Plovers.—The excessive and long-continued rains have attracted immense flocks of these plovers to our marsh lands. During the winter of 1865-66 immense numbers visited the marshes, yet this winter they are greatly in excess: this is more particularly the case with the golden plover; indeed during the last fifteen years I never recollect seeing anything like the congregated thousands at present to be found in this district. So far both species have resorted almost exclusively to the grass-lands, to the neglect of their usual haunts, the fields of young wheat. I did not observe any golden plovers in the marshes before the 31st of October: for a few days after their arrival they are not difficult to get at, but soon learn the range of a gun. On the 14th of November I attempted to stalk, by walking up the drains, a flock of about forty, feeding in company and mixed up with a number of peewits, but the latter birds were far too wary to permit a near approach, and were off on the first alarm, rising in a body, but much to my surprise the golden plovers remained; they were still considerably out of shot, and as there was no possible means of getting nearer, I got out of the drain, and walked up openly to within thirty yards before they rose, leaving, however, five of their number behind as the result of their temerity. On the 22nd an extraordinary flight of golden plovers passed over the marsh district from south to north; for four hours, namely from 10 A.M. to 2 P.M., flock after flock came over; hardly had one lot disappeared in the north before another thin long line appeared on the southern horizon, and so on with slight intermissions during the four hours I was on the look out: occasionally a mob of green plovers came on, all crowded together like a body of irregulars following the line: all flew just out of shot, and

> "Vainly
> I marked their distant flight to do them wrong,"

and only succeeded in bringing down a single bird. The golden plovers flew with wonderful regularity, generally in a long single line, broken here and there by the arrow-head formation these birds so frequently use. Before a long period of severe weather, it is not unusual to see great flights of plovers hour after hour, for nearly the whole of a winter's day, crossing the Humber and proceeding southward, but I never at this season saw them passing southward in such unusual numbers. *Query.*—Were these birds attracted by the excessive floods which at that period prevailed in the northern counties.

Snow Bunting.—First observed November 7th. Since this period have seen large flocks of these buntings feeding in the stubble-fields near the Humber.

Woodcocks.—Have this autumn been very plentiful on the east coast. On comparing notes with my fellow sportsmen I find all agree in this respect, that we have had a large and unusual arrival of woodcocks in this neighbourhood. There was a considerable arrival as late as the 23rd of November. I remarked in my last notes the great disparity in the weight of these birds on their first arrival. I lately weighed two which exhibited this difference in a remarkable degree, one weighing twelve ounces and the other only seven ounces.

Bohemian Waxwing.—November 9th. Saw a fine male of this species in the shop of a bird-preserver at Grimsby. It had been shot three days previously on the coast, in the adjoining parish of Cleethorpes, by a fisherman.

Stonechat.—Saw a single bird, a female, in the marsh on the 17th, and two on the 22nd of November. This bird is very rarely seen in this neighbourhood except during the winter months.

Chaffinch.—I lately passed along a hedge-row containing a large flock of chaffinches, entirely consisting of females, with one exception, one fine old cock bird. It is not unusual to see an old cock bird or two in the flocks of female chaffinches. The sexes, as far as my own observations go, separate into flocks about the first week in November.

Pinkfooted Goose.—December 8th. A goose belonging to this species was brought to me to-day; it was shot in the marshes adjoining the Humber, and, as the man informed me, was one of a small flock of three he had seen on the grass-lands. This bird differs in some respects from the dimensions given by Yarrell of Anser brachyrhynchus, and independent of Yarrell's description I cannot find any other reliable authority wherewith to compare it. It appears to have been unknown to Montagu, and Gould gives no figure of the bird; neither is it mentioned in the late Mr. Wheelwright's Synopsis of the Scandinavian Fauna. I have copied the following remarks from my note-book; they were made the day after the bird was shot:—"Anser brachyrhynchus. Total length of goose from tip of bill to end of tail, thirty-one inches and a half. From carpal joint to end of second quill, eighteen inches. Length of bill, one inch and eleven-twelfths; depth of bill at base, one inch and one-twelfth. Length of head, from base of bill to back of head, two inches seven-twelfths. Nostrils oblong; length of nostrils, two-fifths of an inch. Lateral laminæ very apparent. Iris, hazel-brown. Bill pale waxy pink, deeper along the lateral edges. Nail and a space running backwards from the nostrils to the base of the bill, bluish black. Second quill the longest; first and third nearly equal; fourth much shorter. Tail of fourteen feathers. Closed wings extending about one inch and a half beyond tail. Tail dark gray, broadly edged and tipped with white. Feet very muscular; joints large; hind toe very small. Feet and legs pale fleshy pink; claws bluish black, white at the base. The late Mr. St. John, who was well acquainted with these geese, remarks, "It is a finer bird, and more distinctly shaded and marked, than the bean goose; the general colour of the plumage is lighter." Also "When a flock of bean geese alight on a field to feed, it may be observed that a small company of the birds often separate and feed alone; these will be found to be the pink-footed."

Great Spotted Woodpecker.—December 10th. When shooting to-day I saw one of these scarce woodpeckers in a small plantation of oak in this parish: being anxious to procure a specimen, I tried for some time to get a shot at it, and might have done so had it not been for the pertinacity with which the bird, the moment I brought my gun up, dodged behind the trunks and greater branches of the trees, when the tree was between us flying off to the next; it seemed perfectly aware of its value, and thus led me on from tree to tree, till it finally left the plantation. I saw either this bird or another in the same place on the 22nd of the month.

Food of Wood Pigeon.—In the crop of one, shot November 1st, found seventy-six grains of barley; in the gizzard, partly digested barley with the usual accompaniment of sharp angular stones. November 27th. One shot late in the evening: in the crop four hundred and thirty grains of barley, one charlock seed and a few fragments of red clover plant; gizzard, barley and small stones.

December 24th. Heard a blackbird and a thrush in full song in the garden this morning.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
December 28, 1866.

Ornithological Notes from Norfolk. By HENRY STEVENSON, Esq.

(Continued from Zool. S. S. 442).

SEPTEMBER, 1866.

*Summer Warblers.**—Blackcap and garden warblers, with their young, seen in the garden up to the 12th; spotted flycatchers to the 14th; swifts last seen on the 7th of September.

Hobby.—A fine adult male, killed at Fundenhall on the 5th, had the remains of a young nightjar in its stomach, and about the same time an immature male was killed at Filby.

Gray Phalarope.—Although such an unusual number of these birds were obtained during the autumn in the South of England, I know of but one observed in this county, which was killed by an old woman with a stick, as it fluttered about in a small pool of water on Swardeston Common, near Norwich.

Starlings hawking for Flies.—I can fully confirm the statement of my friend Mr. Barton, of Fundenhall (Zool. S. S. 310), as to starlings occasionally imitating the actions of house martins, when hawking for flies in the higher regions of the atmosphere: knowing his accurate observation of small matters, I could not doubt the fact, although at that time the habit had never come under my own notice. On the

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* A strange error occurred in my previous notes (Zool. S. S. 441), "Migratory *warblers*" being printed for "migratory *waders*," in describing godwits and knots.

30th of September, however, after several weeks of cold and wet, we had a glorious day,—warm as in June,—and the deep blue of the sunny sky was veiled rather than hidden by the light fleecy clouds. About noon, whilst enjoying in the garden this delightful change, I observed several starlings high up in "the blue vault of heaven," circling round and round, after the manner of house martins, and like them, too, occasionally rising a little in their flight, as if to seize some insect a little overhead. Occasionally they would take a wider sweep, and passing at a lower level over the garden, convinced me of their identity, although the total absence of martins at the time (they having retired to the river side for the day) left no ground for doubt. Their actions were certainly different to anything I had ever noticed in this species before, the usual flight of the starling having, for the most part, a settled purpose about it—a hurrying to and fro, whether singly or in parties of three or four. When in flocks, also, their turnings and twistings have a marvellous precision of movement, whilst in this instance no two birds appeared to take the same course, and yet for two hours, at least, they remained on the wing, for no other purpose that I can imagine than that of hawking for flies, judging from the exact similarity of their movements to those of house martins under the same circumstances.

OCTOBER.

Greenfinch.—A very pretty variety of this species was shot at Blofield on the 5th. The plumage of this bird, a female, was almost entirely white, a few pale yellow tinges only appearing on the upper wing-coverts, back and breast.

Swallows and Martins.—A young swallow seen on the 11th, and house martins observed for the last time near the city on the 20th, sharp frosts having set in at night, and the leaves falling fast.

Great Gray Shrike.—One killed about the beginning of the month, and another, an adult male, on the 23rd, near East Harling Station.

Arrival of Autumn and Winter Migrants.—Woodcock, September 30th; wild geese seen on the 1st of October; hooded crow, October 3rd; fieldfare, October 28th.

Cormorant.—A female, in immature plumage, but having the ovaries very distinguishable, was shot near Ormesby Broad on the 12th. Mr. T. E. Gunn, of this city, who preserved this specimen, informs me that the stomach contained no food, but attached to the inner membrane were a number of live worms, eight of which measured about two inches in length each, and were with difficulty removed.

Sky Lark.—A perfectly white specimen was killed near Loddon on the 28th; but in this bird the eyes were of the normal colour.

NOVEMBER.

Winter Visitants.—Lesser redpoles have been extremely plentiful, with a few pairs of mealy redpoles as well. Siskins and bramblings have also been netted by our Norwich birdcatchers, but not in any unusual quantity. Just previous to the first fall of snow, on the 19th, a large number of fowl arrived on the coast, and on the 17th, as I learn from an old marshman at Surlingham, more fowl rose from the reedbeds on the Broad, in the early morning, than he had seen for some years: he described them as looking like "great banks of birds," as they loomed through the fog, and the fact of its having blown hard, out at sea, for a day or two, would account for their resting more inland. Teal have been very plentiful, and it is a good season for woodcocks; a fair sprinkling of snipes, but the marshes much flooded.

Goosander.—A fine adult female shot near Belaugh on the 24th.

Little Gull.—Mr. Frere, of Yarmouth, informs me that an immature bird of this rare species was killed on the beach during the first week in November.

Shore Larks.—A pair of these rare birds, male and female, were shot at Beeston, near Cromer, on the 28th. The female was evidently a bird of the year, having a very small gorget, with the tips of the feathers edged with light brown, and the patches on the cheeks very indistinct. In the male, the larger bird of the two, the black on the head and gorget was more pure, and the sides of the head tinged with yellow: the absence, however, in both, of the rich vinous tints on the shoulders gave them a very sky lark looking appearance about the upper parts of the plumage. The stomachs contained a number of small black seeds and pebbles.

DECEMBER.

Bittern.—The usual migration to our coasts, at this season, of these former residents on our Broads has just commenced. One was killed at Barton on the 1st, another at Wroxham on the 12th, and a third at Barton on the 14th.

Great Gray Shrike.—Another specimen, an adult female, was killed at Hickling on the 5th.

Great Northern Diver.—Two or three immature birds have been killed during the last few weeks at Salthouse and Burgh.

Waxwing.—Since the winter of 1849-50 we have had no such flight of waxwings on this coast, or indeed in any part of England, as have appeared from the 17th of November to the present time. It is impossible at present to do more than allude to their arrival, as every day brings particulars of more seen or procured in all parts of the county, but chiefly on the coast or its immediate vicinity. Some idea of their numbers may be gathered from the fact that I know already of more than ninety specimens killed, of which I have seen about sixty myself; and from a careful examination of so large a series I hope to be able to explode certain errors as to plumage, the number and position of the wax tips on the wings, the difference, or rather want of difference, in the sexes, &c., which have been repeated again and again by British authors.

HENRY STEVENSON.

Norwich, December 18, 1866.

Ornithological Notes from West Sussex.

By W. JEFFERY, jun., Esq.

(Continued from S. S. 517).

OCTOBER—DECEMBER, 1866.

Gray Phalarope.—The month of September last was characterized by an unusually large immigration of this interesting little "lobefoot." On looking through Mr. Knox's Catalogue of Sussex Birds, I find that we had a very similar visit from them in September, 1846 (just twenty years ago), as the following extract will show:—"During September, 1846, after a severe gale from the south-west, which lasted for some days, great numbers of gray phalaropes suddenly appeared on various parts of the coast of Sussex; many were shot, others taken in a dying state, and some killed with stones as they were swimming among the breakers near the shore. They appeared almost simultaneously at Pagham, Worthing, Shoreham, Newhaven, and Hastings. By far the greater number of these phalaropes were birds of the year." ('Ornithological Rambles,' &c., 3rd ed. page 241.)

Blackheaded Gull.—October 9th. Shot a specimen of this gull, in which the rich pinkish or purplish tint, at times observable in this and other species of the genus, was very marked, the whole of the under plumage, as well as the *shafts* and parts of the webs of the first two or three primaries, being suffused with it. This was an adult bird, but the change to winter plumage was not completed, the head having a considerable portion of the black still remaining.

Swallow.—A few swallows seen throughout the first fortnight in October. On the 21st I saw sixteen, but none after.

Spotted Crake.—This is a scarce bird in western Sussex. On the 10th of October I saw one which had been shot near Chichester a few days before.

Lesser Redpole and Siskin.—The lesser redpole has not appeared so numerously as usual this autumn and winter; first seen on the 12th of October, and again on the 23rd, in company with some siskins, feeding on the seeds of the alder. The latter bird, as a rule, is the scarcer of the two; I have known a whole winter pass without so much as seeing or hearing of a single example.

Osprey.—October 17th. An osprey was shot, just within the borders of the adjoining county, Hampshire, *viz.*, near Havant, on the above date. This is recorded in the 'Field' of November 3rd.

Buzzard.—November 7th. A specimen of the common buzzard was brought into Chichester Harbour on board a coal vessel. It was captured by means of a noose, it having alighted in the rigging of the vessel in the dusk of the evening, when off Flamborough Head. It is a small specimen, probably a male, and as the legs are greenish flesh-colour I imagine it to be a bird of the year. Since November 7th it has been in my possession, and is doing well. It throws up "crams" of feathers, bones, and other indigestible matter, the same as owls do.

Hoopoe.—A hoopoe was shot early in the month of October, and sent to a Chichester taxidermist for preservation.

Black Redstart.—A female black redstart was observed in October at a place near the village of Ashling, where a pair were seen and the female shot in October, 1862.

Ring Dove.—The ring dove or "wood pigeon," as it is here called, I noticed passing N.W. in flocks of forty or fifty soon after daybreak, several mornings in succession, about the 21st of November.

Divers.—Both the great northern and the redthroated divers have been scarce this winter. In November a few were killed, and sold for plume manufacture. I have seen, at one house in Chichester, the breasts of fourteen little grebes cut up the middle and sewn together for "trimmings." The "dabchick," as it is here called, is fast becoming a scarce bird.

Dunlin and Ringed Plover.—November 26. For about a fortnight after this date flocks of dunlins and ringed plovers have frequented open fields inland. This has, perhaps, occurred principally during the times of high tide, but I have never known them come inland so much before.

Spotted Redshank.—November 28th. An example of this species was sent from Selsey to Chichester for preservation. It had nearly attained the full winter plumage.

Forktailed Petrel.—December 6th. Again with south-westerly gales the forktailed petrel has occurred, a bird of this species having been shot in Bosham Harbour, and brought me on the above-named day. Excepting that the ends of the primaries and tail-feathers were stubbed, it was in excellent plumage. It has been frequently stated that the petrel, when excited or enraged, has a habit of spurting oil from the curiously formed bitubular nostril. In skinning the present example I discovered a cavity in the skull situated in front of the brain and between it and the bill, connected with the nostrils and the mouth: this cell contained a thick oily matter, having a peculiar smell—a smell which one cannot help noticing in skinning or even handling one of these birds. What the object of this oil-cell can be is to me a mystery. Can it be a means of offence or defence? Perhaps it may be of service in *water-proofing* the plumage of a bird, which one would imagine must require something of the sort, being so constantly on the water; yet, does the petrel spend more time on the water than some other of our Natatores that it should require this extra provision? Mr. Yarrell states that the storm petrel on being taken from the nest vomits a quantity of pure oil, which is carefully preserved by the fowlers, and the bird allowed to escape. Another specimen of the forktailed petrel is recorded in the 'Field' of December 15th, by Mr. G. Dawson Rowley, as having been captured in a "ham and beef shop" in Brighton.

Power of Imitation in Birds.—Dr. Saxby mentions (Zool. S. S. 447) the wheatear as possessing the power of imitation to an astonishing degree. Not living in their breeding haunts I have never noticed this in the wheatear, but in other birds I have. Mr. Legge observes of the sedge warbler (Zool. 9836) "In its curious little warble it imitates, in quick succession, the sparrow, the lark, and the swallow, but seems to have a decided preference to the twitter of the first-named bird." I have seen it somewhere argued that this is no imitation, but only the natural notes of the bird. I do not altogether hold with this argument, yet, what would be the note of the sedge warbler if we "cut out" these so-called imitations? Last spring, soon after the arrival of the summer immigrants, I was more than once deceived, by hearing the sedge warbler exactly imitating the call note of Ray's wagtail. Two years ago a pair of starlings built their nest in the roof of our house, and the male bird used frequently to bring in the notes of other birds in his attempt at singing. Just after the wryneck arrived he caught its note, and would utter it so plainly that it was scarcely distinguishable from the real note of the wryneck. At another time he would give very clearly, but not so loudly as his tutor, several notes of the missel thrush's song. The swallow's "dick richard" also came in amongst others, and I once heard him trying the call-note of the partridge just after having heard that bird, but at this he did not succeed so well. It is noticeable, also, that the lark especially and also the song thrush in the vicinity of the sea vary their song occasionally with the ringed plover's whistle. I have often, when on the coast, looked about me for the last-named bird, only to find that the note proceeded from a sky lark soaring above, or from a thrush in some distant tree.

W. JEFFERY, JUN.

Ratham, Chichester, January 11, 1867.

Erratum.—At page 514, line 20, for "Bishopstowe" read "Bishopstone."

Oological Notes from South-East Essex.

By W. VINCENT LEGGE, Esq., F.Z.S.

THE following are from observations taken during the nesting season of 1866.

Raven.—As this bird is becoming comparatively scarce now, I was surprised to find three pairs nesting within a distance of six miles of this station. They seem to have preferred the lowlands, probably on account of the large trees growing in the hedge-rows, as all three nests were built in tall elms so situated. I have not yet met with any ravens in the uplands of this part of the county, but down here they both breed in the season and remain during the winter. The first nest found was on the 16th of March, and was built high up in the fork of a large elm. The foundation of the nest was very large and straggling, the whole of the fork being filled up by it; the sticks forming it were heaped up in an irregular mass, and on the top of this was placed the body of the nest, made of stout sticks and lined with a great quantity of wool, hair, grass and old rags. The interior was ten inches in diameter and six inches deep. The nest contained five eggs far advanced in incubation, and one of them (probably the last laid) differed considerably in size and colour from the rest. Four of them were of a pale sea-green, clouded and blotched with bluish gray, and spotted and marked over this with olive-brown, and measured two inches by one inch three lines. The fifth egg was of a pale *blue* ground, lightly clouded with blue and with a few spots of olive, and was much smaller. These birds do not exhibit the same amount of courage in defending their nests as the carrion crow does. The female, in this instance, left the nest when I was some distance off, and both birds then flew round and round, uttering loud croaks, but did not come near while I was inspecting the nest. The carrion crow will come within a yard of the intruder's head. As I was leaving the locality of the nest, the male bird, which I had watched and knew by its much hoarser croak than the female, followed me, performing the most wonderful turnings and tumblings in the air, and swooping down with a loud boom in front of me. This continued until it imagined it had by so doing enticed me away from its home. I noticed the following day that the female recognized me at a great distance, leaving her nest and flying towards me. The other nests were similar in every respect to this: one contained five eggs, and the other I did not ascend to. It is singular that the raven, otherwise a very courageous bird, should make so little attempt to defend its nest. I noticed one of these birds last month amusing himself, at a great height in the air, with three kestrels, who were flying round him and dashing themselves against him: he seemed to care but little for their overtures.

Carrion Crow.—The carrion crow is very plentiful here, breeding both in the tall trees in the low lands and in the extensive woods near Hadleigh. They do not nest as early in the season as they are said to do: I paid particular attention to this point during the past season, searching the above-mentioned woods several times in March, and did not find a single new nest. On the 6th of April I found the first new nests, one of which contained four eggs; the others were not finished. Two or three nests I found near the garrison, built in the elms of the hedge-rows, were begun at the latter end of March, but did not contain eggs until the middle of April. The eggs vary much in size, some being short and round, while others are long and oval. Those I have found here have been generally of a sea-green ground, blotched and clouded at one end with light brown, and marked and spotted over this with blackish spots. In a nest there are always some of a darker ground than the others, and generally one or two with the markings crowded at the small end instead of the large end. Some are of a green ground, lightly streaked with olive-brown and no dark markings. One variety I have, in which the ground is a dark sap-green or greenish brown, mottled closely all over with lilac-brown and dark brown spots, and measures one inch ten and a half lines in length by one inch two lines in breadth. The smallest size I have found them is one inch six lines in length by one inch two lines in breadth. The nest of the crow is built of *green* twigs, in most cases torn, as is the case with that of the rook, from the surrounding branches of the tree, and is nearly always placed in the fork of a tree at some distance from the top. The sticks are cemented together with clay, and the lining of the nest is wool, hair and rags, the interior measuring eight inches in diameter. The crow easily deserts its nest if it is climbed up to during its building. A pair near here built three nests in the same tree, deserting each as it was discovered and examined.

Rook.—The rooks are as numerous here as they are in any part of England: within six miles of the garrison there are seven rookeries. They commenced to build this year in the second week in March, and by the end of the month a good many were sitting. In one or two instances, where I could observe the birds at work all the day long, I noticed distinctly that the old nests were repaired, but the majority of the nests were new, the old ones being pulled down during the first week in March. Though I found a great variety among the eggs I examined, I did not meet with any of the very small eggs which rooks sometimes lay. Many have very deep markings at the smaller end, and eggs in the same nest with this sort have no markings at all save a few straw-like streaks of brown. I have one egg in my collection the ground colour of which is yellowish green.

Barn Owl.—On the 24th of March two eggs of this bird, which I have in my collection, were found laid on a truss of hay at the top of a barn: they were some distance apart from one another, and the little girl who found them placed them together. The next day I visited the spot, and found a third laid, and the whole carefully covered up with straw. These three I took, and on the following morning two more were laid. This is the first instance I have heard of in which this bird has thus concealed her eggs.

Lapwing.—There is a small marsh of about two hundred acres, near the island of Potton, where these birds, in company with the common redshank, are in considerable numbers. They have a habit of scratching a great many holes in the ground before they choose one for their nest. I visited the marsh on the 23rd of March, and found numbers of these holes scratched, mostly in the driest parts of the ground, but no nests. I visited it again on the 7th of April, and did not succeed in finding any eggs, though many of the holes were lined with a few bents and small dry chips of cow-dung. A day or two afterwards there were eggs in several nests. I find that these birds, as also the common redshank, do not arrange the eggs in the nest with their small ends in the centre of it until they begin to sit: until the complement is laid they are placed anyhow. I have heard the fanning noise made by the male bird, when dashing about in the air, at a distance of nearly half a mile.

Redshank.—The redshank lays somewhat earlier than the peewit. I found the first eggs (three in one nest) on the 7th of April. They are very clamorous birds, quitting their nests when one is yet a long way off, and thus rendering them difficult to find. No bird that I have seen conceals its nest so cleverly as this one: it is formed in the centre of a green tuft of grass. The herbage is beaten down to form at once the lining and the bottom of the nest, and the surrounding blades are carefully bent over the top, completely hiding the nest from view. The bird enters and leaves it at the side, closing up the openings when frightened from it. The only traces of the nest are a few tracks in the surrounding grass, where the bird has entered and departed from it. A shepherd said to me, "I always knows, sir, there's a tooke's nest in the grass when I sees these 'ere little roads in it." The eggs, as far as I have observed, are always four in number, but they vary much in character: they are mostly of an ochre-yellow or a greenish yellow ground, with bluish gray spots, and then blotted all over, especially at the larger end, with sepia: they are not so thick as the eggs of the peewit, measuring from one inch nine lines to one inch eleven lines by one inch three lines. The latter I have found one inch six lines in breadth, and they are more pointed. One clutch of redshank's eggs had the ground greenish white, with minute specks of brown over the whole surface, and then large blotches and clouds of sepia round the larger end: these were very much pointed, and the shells were very thin.

Little Grebe.—On the 3rd of May, after a short search, I came upon a nest of this bird containing four fresh eggs. It was composed of a mass of weeds heaped up on the surface of the water, and kept firm by the surrounding reeds. The eggs were covered over with wet weeds, and were warm. Ground colour of eggs dirty yellow; two of them had some clouds of brown: they were oval in form, and measured one inch seven lines by one inch. The interior of the shell was deep green. On the 28th of May I found another nest, in which were six eggs and the broken shell of another. The bird had not been hatched more than one hour, yet it was nowhere to be found; it had decamped into the water. A proof occurred here of the small amount of warmth required to hatch and keep alive the young "chick." I took away two eggs, one of which was addled. On arriving at my rooms I laid the eggs in the bath, and was surprised to hear periodical chirpings coming from one of the eggs. Not having time to open the egg then I put it away, and on taking it up the following evening, thirty hours after I had taken it from the nest, I was still more surprised to hear the chirpings again. Assisted by a friend I liberated the hardy little monster, and wrapped him up in flannel: he departed this life, however, on the following day. The egg was not kept in a warm room.

Coot.—The coot is very plentiful on the fresh water in the Essex marshes: they are especially numerous on the lagoons at Pitsea. On the 5th of May I found their nests in tolerable numbers in that locality. I may remark that though I have never surprised a coot or a moorhen on her nest, I have never found their eggs covered up, as is sometimes stated. The habitation of the coot is constructed in water sometimes of a foot in depth, its foundation resting on the roots of the reeds among which it stands. Those I have found have generally been neatly made *columns* of about two feet in height from their foundation; that is, in water of a foot in depth, they rise about a foot from the surface. The materials of the column are reeds cut up to the required length, and laid crosswise on one another around a common centre with great regularity. The lining is a mass of cut-up reed-blades, and the diameter of the column is about ten to twelve inches. It is an admirable example of bird-architecture. The largest number of eggs I have found in one nest is eight: they were of a stone-yellow ground, speckled and spotted all over with small spots of dark brown, slate-blue and bluish black, and measured two inches two lines by one inch five lines. The eggs of the coot do not seem to vary much.

Moorhen.—This bird is equally numerous with the coot in this neighbourhood. I have found their nests in great numbers this year. Some of them are mere slovenly masses of rushes lying on mud-banks among the reeds; others are neatly constructed columns standing in water, and supported by reeds growing round them, in every respect similar to those of the coot. One nest I found was a beautifully constructed abode, with the green blades of the reeds which supported it bent down and woven together, forming a dome about a foot above the eggs. Had the bird an eye for the beautiful, or did she fondly imagine thus to shield her devoted head from the April showers? I am sure that sometimes the eggs in these nests are the produce of more than one bird, as I have found what I am convinced were two distinct clutches in the same nest. In one instance the contents of a nest were as follows:—four eggs, small and of oval form, measuring one inch five lines by one inch one line; ground whitish yellow, spotted sparingly with lilac, lilac-red and brownish red: six eggs, large and of a tapering form; ground colour reddish yellow, with large irregular blotches of dark brown-red and dark slate-colour; dimensions one inch nine lines by one inch three lines. These, every one will see, were the produce of two distinct birds. The eggs, however, vary very much in size and number. I have found twelve in one nest, and four sat upon in another.

W. VINCENT LEGGE.

Shoeburyness, December 19, 1866.

Rabbits breeding in January.—When ferreting rabbits the other day, the ferret got amongst a litter of young rabbits not more than four days old. The nest was placed at a considerable depth in the ground, not as is usual near the surface, and was almost completely composed of rabbits' fur. We had to dig out the ferret, which, after a sumptuous mid-day meal, had lain down beside its victims to indulge in a restorative snooze. The surface of the ground was frozen to the depth of four inches. —*John A. Harvie Brown; Dunipace House, Falkirk, January* 15, 1867.

Hare feeding on Hawthorn-berries.—Upon examining the contents of the stomach of a hare I shot lately, I found it consisted almost entirely of the berries of the hawthorn: this, I suppose, must be accounted for by the absence of their usual food, the snow at the time being six inches in depth.—*George Mawson; Moor Side, January* 5, 1867.

Roughlegged Buzzard in Dumfriesshire.—I was in my birdstuffer's premises in Edinburgh (Mr. Small's, George Street), and saw a most magnificent specimen of the roughlegged buzzard, which struck me as being considerably above the usual size and of unusually dark colour, almost approaching to black. Mr. Small gave me the following particulars concerning its capture:—"The bird was shot at Billholm, near Laugholm, Dumfriesshire, and is the property of Mr. Richard Bell, of Billholm. It was shot by him on the 1st of December, whilst soaring over his head, and it fell, bursting its gizzard, which was quite gorged with food." I regret I cannot send you the measurements of this bird, as I believe they were not taken before its being stuffed.—*John A. Harvie Brown; Dunipace House, Falkirk, January* 15, 1867.

Cornish Specimens of the Jerfalcon and Redfooted Falcon.—The specimen of the jerfalcon which you have recorded in the pages of the 'Zoologist' as having been killed at Port Eliot, near St. Germans, has come into my possession, as well as of the redfooted falcon, killed on Wembury Cliff, in Plymouth Sound. The former is nearly an adult male bird, with the head and throat entirely white, as well as the whole of the tail-feathers, both upper and lower surfaces: from the lower part of the throat to the whole of the belly are sparingly distributed drop-like spots pointing downwards; these are largest on the flank above the thigh-feathers, which are also pure white; the shape of these spots underneath may be best described by likening their shape to the downstroke of a note of admiration. Mr. Vincombe, from whom I had the bird, assured me that the cere and legs were blue: he had it alive for some time. The redfooted falcon is a very good and adult male, in the dark slate plumage with tile-red thighs.—*Edward Hearle Rodd; Penzance.*

Remarkable Shot.—On the 8th of the present month a somewhat remarkable shot was made here by a bird-preserver, whilst out seeking specimens: he saw three blackbirds sitting on a bush, the weather being very warm and the sun shining brightly: on the same bush, above the blackbirds, but in close quarters with them, sat another larger bird quietly preening his feathers: he shot at the larger bird, and great was his surprise to find that he had shot a beautiful male kestrel together with one of the blackbirds. This fact, I think, does away with the supposed propensity of the kestrel preying on birds, or at all events it shows that the blackbirds had no such fears in this instance: I believe, in the many cases in which the kestrel has been detected feeding on birds, they have found them dead.—*Stephen Clogg; Looe, Cornwall, January* 10, 1867.

Our Gray Shrikes.—Since writing last month on the subject of two kinds of gray shrike, I have been able to refer to Wilson's 'American Ornithology.' I find he speaks of two kinds, *viz.*—

1. American Shrike (*Lanius excubitor*, Wilson; *L. borealis*, Vieillot).
2. Loggerhead Shrike (*L. carolinensis*, Wilson; *L. ludovicianus*, Linnæus).

The first seems to be the same bird as our L. excubitor, though he speaks of only *one* white spot, and of crescentic marks on the under part of the male, which would only apply to the immature bird. This, however, is not surprising, as no one seems to have noticed the marked distinction which appears to exist between the male and female of our L. excubitor, the former when adult having *two* spots, the latter *one*. The second of the above-named species seems to me to be this species, of which Mr. Rodd's bird (described before as No. 2) may prove to be a specimen; the only noticeable difference being that L. carolinensis has a line of black in front of the head over the beak, which No. 2 has not; but the absence of this may perhaps be conuected for by age and sex. The above confirms my former remark that the various notices in the 'Zoologist'—with one exception (Zool. 2650), where the mistake is calling the smaller bird L. borealis—refer simply to examples of L. excubitor. Still it appears probable that when the distinction is understood, the loggerhead shrike (*L. carolinensis*)—if that *is* the bird in question—may prove to be of occasional occurrence in this country. In Bree's 'Birds of Europe' this bird is said to be identical with L. meridionalis of Temminck.—*J. H. Jenkinson; St. Mary's Vicarage, Reading, January* 15, 1867.

Curious Processes in the Tail of the Redwing.—During the late severe weather I have shot many redwings here, and in one specimen have noticed a very peculiar abnormal condition in the tail, the feathers of which have well-marked projections in the direction of the shafts, fully one-sixteenth of an inch beyond the web of the feather, reminding one of similar projections in the tail of the Australian spinetailed swift. This peculiarity, in my specimen, may certainly have been caused by the feathers being worn away by abrasion; but the regular form of the projections goes against this view. I have thought this occurrence of sufficient interest to send it to you for publication, for possibly similar projections may have been observed in other birds.—*G. Norman; Ben Rhydding, Yorkshire, January* 13, 1867.

Black Redstart at Looe.—A black redstart, in winter plumage, was shot here last Saturday, and another was seen the week before.—*Stephen Clogg; Looe, Cornwall, January* 10, 1867.

Waxwings in Peebleshire.—I saw in Mr. Small's shop four or five waxwings (I forget the exact number), which were shot near Peebles on the 7th of December and on the 8th instant. The gamekeeper who shot those on the day first named evidently did not know the value of the birds, as he offered to procure some more for Mr. Small, if the latter would stuff one for him, stating that there was a large flock of them near Peebles at that time. However, the flock did not wait for him, and he did not succeed in getting any more.—*John A. Harvie Brown; Dunipace House, Falkirk, January* 15, 1867.

White Linnets.—The following abstract from a Scotch local newspaper may be of interest to some of your readers. It is taken from the 'Kircudbrightshire Advertiser,' of Friday, the 28th of December last:—"Among the many flocks of gray linnets in the neighbourhood of Selby, the bird-catchers have observed several pure white linnets, and though every exertion has been made to catch them they have hitherto eluded their snares, though many of the gray linnets have been caught." I do not know at all if pure white linnets are rare or not, but I suppose that they are not very common.—*A. Clark-Kennedy; 14, Princes Gardens, Princes Gate, W., January* 4, 1867.

Late Swallow's Nest.—A friend of mine, residing at Walton-on-the-Naze, Essex, has sent me an account of a pair of swallows having built a nest at that place so late as the latter end of November last. These birds (or it was believed the same pair) began a nest about that time, at one of the houses on the Terrace, near the sea: from finding that spot too cold, or from some other cause, they soon abandoned it, and went to a farm-yard a little further inland, where, inside a barn, they not only completed a nest, but three eggs were laid in it, after which the birds disappeared. The persons at the farm had watched them with great interest, being, curiously enough, nearly related to those inhabiting the house on the Terrace, where they were first observed to be building: it was supposed by them that a threshing-machine, coming into the yard, eventually frightened the swallows away, but it is perhaps more probable that their natural instinct, though so late in its promptings, at length caused them to migrate, in spite of the attraction of a new home. I perceive it is stated in Yarrell's 'British Birds' that even the young birds are now and then thus forsaken when hatched in autumn, but there is no mention in any work to which I have referred of so late a nest as this one. My friend was kindly allowed by the farmer to have possession of the deserted nest and eggs. I have not seen them, but an experienced naturalist, on examination, pronounces them to be certainly those of the chimney swallow, the eggs, however, being nearly one-third smaller than the average. Would this peculiarity render it likely that the birds belonged to an early brood of the same year? A young egg-collector has just remarked to me that several species of birds do lay the first year, and that the eggs are very small; he instanced the wren, thrush, &c. The nest mentioned above was detached whole, being built on a rafter against the wall; the back is, of course, flat: it is composed of mud, with a few feathers and a little hay; the eggs, as usual, spotted with pale red. On being blown for preservation, their freshness proved them to have been recently laid.—*S. King; Sudbury, January* 14, 1867.

The Willow Grouse and Red Grouse perching.—I am glad to be able to remove one point of difference, which was considered fatal to my views of the identity of the Norwegian willow grouse and the British red grouse. In a communication (Zool. 8955) Mr. Reeks, quoting from the late Mr. Wheelwright, asks "whether the red grouse had ever been known to perch on a tree." In my reply (Zool. 9045) I stated that if the willow grouse really did perch, and the red grouse did not, then this fact alone would go strongly against my views of their identity. At that time, it is scarcely necessary to say, I was not aware that the red grouse did ever perch on trees, but now I am glad to be able to remove this doubt. A few weeks ago I was shooting on the moors here above Middleton Hall, and while discussing various habits of the grouse with the keepers, accidentally mentioned the subject of grouse perching. To my great surprise three of the keepers informed me that this habit is by no means infrequent: the head keeper, pointing at the time to a plantation of Scotch pine called "Ling Plantation," said he had often seen grouse perching there: this was corroborated by others present. I have spoken with other shooters in this district who have also seen them perching in trees, so that I think this point of supposed difference must fall to the ground. It strikes me as being very strange that when this subject was being discussed in the pages of the 'Zoologist' no one should have come forward to settle this interesting point of perching, for surely it must have been observed by sportsmen in different parts of the country.—*G. Norman; Ben Rhydding, Yorkshire, January* 13, 1867.

Note on the Occurrence of Quails near Belfast.—I saw this day in Leadenhall Market six quails, which I was informed were part of a consignment of eight, which had arrived together from a locality in the neighbourhood of Belfast. The birds I saw were in excellent condition; four were in the usual adult winter garb, the other two had speckled throats, which I presume was a remnant of their immature dress. The occurrence of eight quails in one locality in England at the same time, in winter, would certainly be an uncommon event; whether such a circumstance is equally rare in Ireland I know not, but it appears worth recording.—*J. H. Gurney; January* 4, 1867.

Plumage of the Oystercatcher.—I shot two specimens of the above-mentioned bird at Hunstanton, in Norfolk, last autumn, one of which was rather larger than the other, and had a white gorget of about one inch and a half in length, and about two inches in breadth; while the smaller bird had its neck, to the breast, of a pure glossy black, and its bill was more black at the end than that of the other bird. Mr. F. O. Morris says that there is no difference in the plumage of the male and female oystercatcher. Can this difference be sexual, and if so, which is the male and which the female?—*A. Clark-Kennedy.*

Great Snipe near Dorchester.—My brother shot a specimen of the great snipe (*Scolopax major*) near here on the 29th of November last: it was flushed in a reedbed, at the same time as six or seven common snipe, but was lying apart from them, and at once attracted attention by its superior size and different mode of flight. The dimensions of this bird (a male) are as follows:—

Length from end of tail to base of bill - -	$9\frac{3}{4}$ inches.
„ from base of bill to tip - - -	$2\frac{3}{4}$ „
„ from carpal joint to end of wing - -	$5\frac{2}{10}$ „
Extent of wings - - - - -	$17\frac{1}{2}$ „

Agreeing with those given by Yarrell and Montagu, but the weight seems to be less than usual, as it barely weighed six ounces, although in fair, but not fat, condition.—*James Shorto, jun.; High East Street, Dorchester, December* 13, 1866.

Unusual Occurrence of the Smew.—I saw to-day, at one dealer's in Leadenhall Market, fourteen smews, which he informed me he had received from Holland. Never having seen so many specimens of this bird in one lot before, I think the circumstance worth recording, especially as I have only seen one specimen in the market previously this winter, a female, also from Holland, on the 6th of December last. The fourteen which I saw to-day were partly males and partly females, but the former were all in immature plumage.—*J. H. Gurney; January* 16, 1867.

Blackthroated Diver at Wickham, Hants.—On the 9th of January, heavy gales and squally weather having prevailed during the week, a beautiful male specimen of the blackthroated diver (*Colymbus arcticus*, Linn.), in full winter dress, was shot upon the ornamental water at Rooksbury Park, Wickham, Hants, by Mr. Orred's keeper, and forms a valuable addition to my collection. In the stomach was a fresh roach $4\frac{3}{8}$ inches in length and $2\frac{1}{4}$ inches in girth, together with a few small pebbles.—*Arthur W. Crichton;* 11, *Eaton Place, S.W.; January* 16, 1867.

Sabine's Gull in Cornwall.—A specimen of Sabine's gull, in the first year's plumage, was shot in November, on the River Lyntrer, St. German's, Cornwall, by Mr. Spencer, naturalist, and is now in the possession of the Rev. A. Furneaux, St. Germans.—*Alan Furneaux; St. German's, Cornwall, January* 23, 1867.

Ornithological Notes from Stirlingshire.—Bramblings appeared here, and in still greater numbers at Kilsythe, on or about the 7th of this month (January), and disappeared on the 9th or 10th. Various ducks are numerous on the Frith of Forth, and considerable numbers of mallard, teal and widgeon come up our river (the Carron) every day. Bean geese have come far inland this winter; yesterday a flock, or "gaggle," alighted on a frozen pond near this, seven miles from the Frith; they generally, in this part of the county, do not come further inland than Latham Moss, which is only three miles from the sea.—*John A. Harvie Brown; Dunipace House, Falkirk.*

Correction of an Error.—Zool. S. S. 559, 17th line from top, for "hind throat," &c., read "head, throat," &c.—*N. Cooke; Liverpool, January* 8, 1867.

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